

ORIGINAL ARTICLE

COST ANALYSIS OF TREATING INCOMPLETE MISCARRIAGE WITH DILATATION AND CURETTAGE IN UNIVERSITI KEBANGSAAN MALAYSIA MEDICAL CENTRE IN 2010

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ABSTRACT

- Background :** Miscarriage is a common problem in pregnancy which can occur during early, mid or late pregnancy. Incomplete miscarriage can be treated expectantly, medically or surgically. The most preferred method used in UKMMC is using sharp curettage.
- Methodology :** This study is conducted in the UKMMC from 1st January 2010 to 30th March 2010. The purpose of this study is to analyze the cost of treating incomplete miscarriage using metal sharp curettage from the provider's perspective per patient-day.
- Result :** A total of 17 samples were eligible for analysis from 46 patients who fulfilled the inclusion and exclusion criteria. The cost is derived from cost calculation on capital and recurrent costs. Results showed that the average cost for treating incomplete miscarriage using sharp curettage per day is RM252.56. Recurrent costs contributed 83.3% of the total treatment with overhead cost was the biggest percentage (51.6%).
- Discussion** The treatment cost for incomplete miscarriage using sharp curettage is found to be higher as compared to medical approach according to literatures. The higher cost of surgical approach was mainly attributed to the recurrent cost which is included in the calculation.
- Conclusion :** Effective usage of the operation theatre and all resources should be managed and utilized well in order to achieve optimum outcome.
- Keywords :** Cost Analysis, Provider Cost, Incomplete Miscarriage, Sharp Curettage, Dilatation And Curettage (D&C).

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INTRODUCTION

Miscarriage accounts for approximately 50 000 inpatient admissions in the United Kingdom annually. It is common, occurring in 15–20% of all pregnancies, and can have both medical and psychological consequences and mostly about 80% occurring in the first trimester of pregnancy¹. In University Kebangsaan Malaysia Medical Centre (UKMMC) from January 2010 to Mac 2010 there are 47 cases were admitted due to incomplete miscarriage.

A miscarriage is actually the spontaneous or induced loss of an early pregnancy. The period of pregnancy prior to fetal viability outside of the uterus is considered early pregnancy. Most consider early pregnancy to end at 20 weeks' gestation or when the fetus weighs 500 grams. Chromosomal abnormalities in the embryo are the commonest cause for miscarriages². Typically, the distribution of miscarriage rates by age occurs as follows: younger than 35 years old, 15% miscarriage rate; 35–39 years old, 20–25% miscarriage rate; 40–42 years old, about 35% miscarriage rate; and older than 42 years old, about 50% miscarriage rate.

Traditionally, the diagnosis and treatment of this condition has depended on the patient's symptoms because viability was difficult to determine before documentation of audible fetal heart tones in the second trimester. Thus, the classic diagnostic categories and treatment approaches are based on clinical presentation. Threatened abortion, with bleeding in the presence of a closed cervix, but with unknown viability, was treated expectantly. When the cervix had dilated, inevitable and incomplete spontaneous abortions were treated with uterine curettage because these conditions indicate non viability of the pregnancy³. Surgical evacuation of the uterus for management of incomplete abortion also called evacuation of retained product of conception usually involves vacuum aspiration or sharp metal curettage. Vacuum aspiration (also called suction curettage, menstrual regulation, endometrial aspiration, or mini-suction) utilises a vacuum source for the evacuation of the uterus. It can be performed on an outpatient basis with local anesthesia or analgesics. Vacuum aspiration can be used without electricity with a hand-held vacuum syringe (Manual Vacuum Aspiration). It can also be performed with an electric or foot-operated mechanical pump. Sharp metal curettage (also called D & C or dilatation and

curettage) is often performed in an operating room under general anesthesia. In this method, a metal curette is used to evacuate the contents of the uterus. Sharp curettage is mostly performed without dilatation of the cervix, as the cervical canal is usually already open in incomplete abortion⁴.

In many developing countries, sharp curettage is still the most common method of treating incomplete abortion and had been the most commonly performed standard treatment since the 1930s, even though complications such as uterine perforation, life-threatening haemorrhage or post-surgical pelvic infection may arise. In most developed countries, vacuum aspiration has replaced sharp metal curettage, but still in many developing countries, physicians continue to use sharp metal curettage because they are not trained in vacuum aspiration, they do not have the necessary equipment to perform the procedure, or in some cases they are not convinced of the effectiveness of the procedure. Medical management of incomplete abortion is becoming increasingly common, but it may not be a feasible option in countries with limited health care resources, as it requires careful follow-up, continued access to medical care, and availability of relatively expensive drugs⁵.

In the past decade, expectant care and medical treatment have been shown to be effective alternatives for treatment of spontaneous abortion. A number of clinical trials reported that expectant management usually achieved complete evacuation of product of conception (POC) within two weeks of diagnosis with low infection. A study has shown that medical management of an uncomplicated incomplete first trimester miscarriage with misoprostol, a synthetic prostaglandin analogue, had a 96% success rate and may be a suitable cost saving alternative.⁶

Unsafe miscarriage is one of the five leading causes of maternal mortality worldwide. In order to manage the treatment of incomplete miscarriage at hospitals, which often results from unsafe miscarriage, drains a lot of resources in healthcare systems throughout the developing world⁷. Due to the high level of resource consumption, reducing the costs associated with treating incomplete miscarriage would be clearly advantageous. Improving incomplete miscarriage services, by making them more accessible and cost effective, is a key component of improving family-planning services overall⁸. Analyzing

cost of treating incomplete abortion is crucial before the actual cost effectiveness study can be done. However, the study on cost analysis especially in hospitals with incomplete data on cost is very challenging.

Despite the many complications which may arise in using sharp curettage as the main mode of treatment of incomplete miscarriage, this is the most preferred method used by the Obstetrics and Gynaecology (O&G) specialists in UKMMC. Therefore evacuation of retained product of conception using sharp curettage is one of the most common procedures done in Obstetrics and Gynaecology operation theater in UKMMC and it consumes a lot of resources. Cost analysis data can enable policymakers and managers to identify trends in resource utilization and miscarriage patient management. Therefore this study is carried out to calculate the actual provider's cost of treating incomplete miscarriage by sharp curettage.

METHODOLOGY

This is a cross-sectional study which is conducted at UKM Medical Centre (UKMMC) Cheras Kuala Lumpur starting from 1st January 2010 to 30th March 2010. This is a retrospective study and partial economic evaluation as we only take into account the costs from the provider's perspective (hospital cost). During this period data collection is done and the result is based on the average cost of treating incomplete abortion using sharp curettage per patient-day.

Universal sampling whereby patients who were diagnosed to have incomplete abortion and planned for sharp curettage from 1st January 2010 to 30th March 2010 were included into the study sample. Patient who has incomplete abortion and planned for sharp curettage but with other complications are excluded from the study.

Rapid assessment data collection technique was used to collect data on factors contribute to the cost of managing incomplete abortion. The procedures include direct observation at the O&G admission centre and in the ward, informal conversation with nurses and doctors involved in managing patient with incomplete abortion and also interview with key informants such as sister at gynaecology ward, O&G specialist, officer in charge of case mix system at UKMMC and officer at administrative department.

Data collection was started by interviewing the O&G specialist to find out about the management protocol for patient with incomplete abortion. This includes their management procedure and staffing situation. Then, data on the hospital costs associated with management of incomplete abortion is collected through informal conversation with the officer at administrative department and followed by checking the data from the case mix system. All of the information gathered through the interviews and records were then confirmed by subsequently observing the complete treatment process that patients with incomplete abortion had to go through from their diagnosis to their discharge.

Cost analysis was done using both micro-costing as well as macro-costing. Calculation using macro-costing is divided into capital cost which is further divided into building cost with lifespan of 20 years and 5% annualizing factor, furniture cost (5 years, 5% annualizing factor) and equipment cost (5 years, 5% annualizing factor) and the other cost for cost calculation is recurrent costs. It is calculated based on the human resources, drugs, consumables, utilities, maintenance, overhead costs and also laboratory investigations. Human resources, drugs, consumables and laboratory investigations are calculated based on activity-based costing whereas consumables, utilities, maintenance and overhead costs are calculated using floor space. However, administration cost which is included in the overhead cost is calculated using apportioning, by taking the total cost of administration divided by the total number of UKMMC staff. The number is then multiplied by the total number of O&G staff to get the total administration cost for the department, and the total cost is divided by the total number of patient-day to get the administration cost per patient day for O&G patient.

The cost of human resources is calculated based on the number of staffs directly involved in each activity and the time spent with patients for each activity is calculated based on estimations of a few personnel interviewed. The salary per minute for each staff is multiplied by the time they spend with each patient to get the cost of human resources per patient.

Cost of drugs, consumables and laboratory investigations are calculated by counting the total number of items consumed by each patient according to the patient's record then the total cost is calculated for all

patients. The total cost is then divided by the patient-day to get the total cost per patient-day.

RESULTS

Socio-demographic description

There were 46 patients diagnosed with incomplete abortion from January to March 2010 in UKMMC. However, there were only 17 records available to be analyzed since the other case notes are being used in the clinics for follow up of the patients.

Mean age of the subjects are 31.2 years (min 23, max 44). Majority of subjects are Malays with 39 subjects (82.9%), followed by Chinese with 5 subjects (10.6%), India 1 subject (2%) and other races 2 subjects (4.7%). The mean length of stay in the hospital for the obstetric and gynaecological admission is 2.5 days.

Cost of treatment of incomplete abortion with sharp curettage from provider's perspective.

Universiti Kebangsaan Malaysia Medical Center (UKMMC) started its operation since 1997 with building cost of RM230 million, spreading over 115,802 meter squared of floor space. For this study, the floor spaces of four obstetric and gynaecology (O&G) wards, the operation theatres and the Obstetric and Gynaecology Admission Centre (OGAC) are being used which totalled up to 3102 meter squared. The staff capacity for the year 2009

for O&G department is 279 personnel, including 60 medical professionals, 205 nursing staffs and 14 supporting staff. The total number of O&G patients is 14031 patients, total number of incomplete abortion patients is 188 patients and the average length of stay (ALOS) for obstetric and gynaecology case is 2.5 days. The number of patient-days is calculated by multiplying the number of patients for the year 2009 with the ALOS, which totals up to 35752.5 patient-days.

The building cost per patient-day is RM13.83. The furniture cost is RM20.17 per patient day whereas the equipment cost is RM8.13 per patient-day. The capital cost per patient-day is RM42.13. Based on the above calculation, the capital cost involving building, furniture and equipment costs contribute to 16.7% of the total treatment costs for patients per day admitted to UKMMC for treatment of incomplete abortion with sharp curettage.

The total recurrent cost to treat incomplete abortion with D&C is RM210.43 (Table 1). This portion of cost is shown to be the higher contributory to the average cost of treating incomplete abortion with sharp curettage which contributes 83.3% of the total cost. Therefore it can be concluded from this study that the total cost of treating incomplete abortion using sharp curettage from the provider's perspective is RM252.56 per patient-day (capital cost: RM42.13 + recurrent cost: RM210.43).

Table 1: Recurrent costs of incomplete abortion with D&C treatment (in Ringgit Malaysia)

No.	Category	Cost (RM)
1.	Human Resources	108.12
2.	Drugs	0.77
3.	Consumables	0.66
4.	Utilities	13.83
5.	Maintenance	40.69
6.	Overhead	42.79
7.	Laboratory Investigations	3.57
	TOTAL	210.43

DISCUSSION

Based on this study, the average direct cost from the perspective of UKMMC as the provider for the treatment of incomplete miscarriage using sharp curettage per patient day is RM252.56. If the total cost per episode is taken into account by multiplying it with the average length of stay therefore the total cost

per episode is RM631.40. This value is still lower than the studies done overseas, however, this study has a number of limitations in which there is not enough data especially with regards to the individual equipment being used in the operation theatre, the sample size is also quite small as the medical records are difficult to obtain as they are being used in other departments or kept in the specialist clinic for

follow up. Although this value is far from the value from cost per DRG (Diagnosis-Related Group) from the Case-Mix Unit which totals up to RM2013⁹. This is also in comparison with study done by Hughes et al. where they found that the average cost of surgical treatment was GBP397 versus medical treatment (GBP347)¹⁰, and a cost analysis study based on modeling found that surgical evacuation will cost US\$2007 per patient compared to misoprostol group (USD\$1000) and expectant (USD\$1172)¹¹.

Most of the costs were contributed by the recurrent costs, with the overhead cost covers about 51.6% of the total recurrent cost, and approximately 43% of the total cost. The highest cost is related to the administration cost, which was calculated based on the total cost of O&G department averaged per patient-day. This study, however, did not look into other costs for example the patient's cost and the effectiveness of the method, therefore, no reference can be made with regards to this.

Despite being at a higher cost compared to medical abortion, surgical procedure is still being done and is a preferred method especially when there is clinical evidence that the miscarriage is incomplete¹². Other study showed that surgical procedure is a faster, safer and more acceptable up to about 18 weeks of gestation¹³ compared to primary prostaglandins (PG) and PGF_{2α}, and there is no difference in the long term conception rate and pregnancy outcome compared to medical treatment¹⁴, and there is no difference existed in activities of daily living on any of the eight subscales of the UK SF-36¹⁵.

CONCLUSION

Based on the cost analysis on the treatment of incomplete abortion using sharp curettage that has been performed in UKMMC, the average cost from the provider's perspective is RM252.56. Because the treatment is quick and safe in comparison to medical and expectant approach, the patients can return to their daily activities faster and since there is no difference in the short term outcome such as the scores in SF-36 as well as long term outcome in terms of reproductive rates and pregnancy rates, it might be a cost-effective method if taken from the societal point of view. Therefore, a more comprehensive cost-analysis study involving a full economic evaluation especially in the costs from the provider's perspective as well as the

patients' cost including the quality of life and reproductive potential is highly recommended.

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